HOV/HOT Lanes

FEBRUARY, 2007

Easing Traffic Congestion

I-5, HOV Lane, Orange County

Traffic congestion continues to be a significant issue in metropolitan areas throughout the country. Transportation agencies at the federal, state, metropolitan, and local levels are using a variety of techniques and approaches to improve traffic flow, enhance mobility, and provide travel options.

High-occupancy vehicle (HOV) lanes are one approach in use in some areas to ease traffic congestion. HOV lanes provide travel time savings and improved trip time reliability to encourage travelers to change from driving alone to carpooling, vanpooling, or riding the bus. HOV/high-occupancy toll (HOT) lanes expand the allowed user groups to include solo drivers or lower-occupant vehicles, who can access the lanes by paying a fee.

HOV/HOT lanes provide mobility options to travelers in congested travel corridors. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) allows increased flexibility for state departments of transportation and other agencies in maximizing the use of HOV facilities. SAFETEA-LU provisions address tolled vehicles use of HOV lanes with available capacity.

This brochure, provided by the Federal Highway Administration (FHWA), highlights the HOV/HOT concept and illustrates examples of current projects. Factors influencing the development of these projects are described, along with the benefits realized to date.

Sources to obtain more information on HOV/HOT lanes are highlighted on the last page of the brochure.

INSIDE:

I-25 Express Lanes, Denver

What are HOV/HOT Lanes?

I-10 West HOV Lane, Houston

High-Occupancy vehicle (HOV) lanes are one approach used in some metropolitan areas throughout the country to help improve the people moving capacity rather than vehicle-moving capacity of congested freeway corridors. The travel time savings and improved trip time reliability offered by HOV lanes provide incentives for individuals to change from driving alone to carpooling, vanpooling, or riding the bus.

HOV lane applications have evolved over the past 35 years. Early projects focused primarily on bus-only facilities. Carpools became the dominate user group on most HOV lanes in the 1970s and 1980s. Currently, freeway HOV lanes are in operation in metropolitan areas in 20 states.

In the 1990s, a few areas began experimenting with value pricing projects, often called high-occupancy toll (HOT) lanes, which were allowed under the Value Pricing program in previous federal legislation.

HOV/HOT lanes expand the allowable user groups to include single-occupant or lower-occupanct vehicles for a fee, while maintaining free travel to qualifying HOVs. HOV/HOT lanes enhance mobility and travel options in congested corridors.

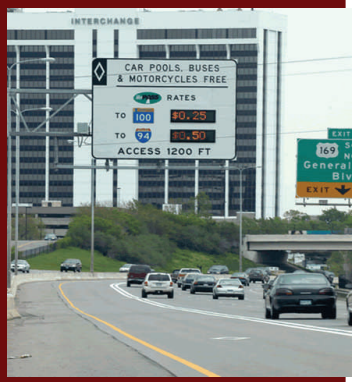
SAFETEA-LU provides additional flexibility to operating agencies to allow exempt user groups when available capacity exists on an HOV lane. Tolling single occupant vehicles represents one of the exempt user groups. In addition, the introduction of electronic toll collection (ETC) and other advanced technologies provide greater opportunities for pricing applications on HOV lanes.

SAFETEA-LU provides flexibility in expanding HOV lane user groups to include toll vehicles and energy-efficient vehicles

SAFETEA-LU

SAFETEA-LU contains a number of provisions relating to HOV facilities. SAFETEA-LU provides operating agencies with the flexibility to allow certain vehicles not meeting the occupancy requirements, including tolled single-occupant or lower-occupant vehicles.

The Act requires operating agencies to monitor, evaluate, and report on the use of the lanes by these vehicles, and to limit or discontinue their use if the operation of a facility becomes degraded. SAFETEA-LU defines a degraded condition if vehicles using the facility fail to maintain a minimum average operating speed 90 percent of the time over a consecutive 180-day period during the morning or evening weekday peak-hour periods. The minimum operating speed is defined as 45 mph when the posted speed limit is 50 mph or greater.



I-394 MnPASS, Minneapolis

HOV/HOT Projects

Information on HOV/HOT projects in San Diego, Minneapolis, Denver, Salt Lake City, and Houston is highlighted on the next pages. Projects in the planning and development stages in Seattle and other areas are also summarized.

A few common themes emerge from the case study examples. These themes include multi-agency involvement in projects, the need for state legislation to allow for tolling, and maintaining flexibility to make operational adjustments as needed. The case studies also indicate that HOVs — carpoolers, vanpoolers, and bus riders — continue to be the major user groups on HOV/HOT lanes.

I-15 Express Lanes, San Diego

I-15 Express Lanes, San Diego

The I-15 Express Lanes in San Diego represent the first HOV facility in the country to expand to an HOT project. During the initial phase, which began in 1996, between 500 and 700 monthly permits were sold to motorists on a first-come, first-serve basis for $50 to $70.

The ETC phase was introduced in 1998. The FasTrack™ Express Lanes use variable electronic toll collection. The fee depends on the congestion level in the HOV lanes and is recalculated each six minutes to maintain free flow conditions. Fees typically range from $0.50 to $4.00 according to the time of day relative to traffic peaks, although the fee could reach as high as $8.00. Message signs located before the start of the lanes display the updated fee.

The initial demonstration project and the ongoing operation of the Express Lanes represent the joint efforts of the San Diego Association of Governments (SANDAG), the California Department of Transportation (Caltrans), the Metropolitan Transit System (MTS), and the California Highway Patrol (CHP). SANDAG is responsible for overall project management, Caltrans operates the HOV lanes, and MTS operates bus service in the corridor. CHP is responsible for enforcement, which is done visually at the entry point to the facility.

The I-15 two-lane barrier-separated HOV facility opened in 1988, with a 2+ vehicle-occupancy requirement. The eight-mile long facility operates inbound toward downtown San Diego in the morning and outbound in the afternoon. There is one entrance and one exit to the facility.

By 1996, approximately 1,800 vehicles were using the HOV lanes during the morning peak-hour. The adjacent freeway lanes were congested, while capacity was available in the HOV lanes.

Interest in considering pricing on the HOV lanes emerged during the examination of potential transportation control measures in the regional air quality plan. The pricing approach was supported by the mayor of a suburban community in the corridor. This individual was elected to the State Assembly and sponsored the enabling legislation needed for the project.

As of March 2005, there were approximately 18,670 active FasTrak™ accounts and some 27,700 transponders in use. In 2004 and 2005, the daily weekday average traffic using the I-15 Express Lanes ranged from a high of 22,341 in March 2004 to a low of 19,401 in February 2005. Over this time period, HOVs accounted for approximately 75 percent to 78 percent of the total vehicle volumes. FasTrak™ users accounted for most of the remaining 22 percent to 25 percent. Annual revenue generated from FasTrak™ users is approximately $1.2 million.

The revenue has been used to support operations of the system and to expand public transportation services in the corridor. The Inland Breeze bus service provides express trips into downtown San Diego and reverse commute trips to suburban destinations in the corridor.

Inland Breeze Bus, San Diego

I-394 MnPASS, Minneapolis

MnPASS allows solo drivers to use the HOV lanes on I-394 for a fee. Dynamic pricing is used, with tolls based on the level of congestion in the HOV lanes. The base toll is $.25 and the maximum toll is $8.00.

MnPASS, which was implemented in 2005, represents the first use of tolling in the Minneapolis-St. Paul metropolitan area. MnPASS also represents the first HOV/HOT project in the country on concurrent flow HOV lanes.

Drivers must have a valid MnPASS transponder displayed on the front windshield to use the lanes without meeting the vehicle-occupancy requirement. MnPASS transponders can be purchased on-line and at the MnPASS Customer Service Center.

MnPASS represents a partnership of the Minnesota Department of Transportation (Mn/DOT), Metro Transit, the Minnesota State Patrol, and local communities.

I-394 HOV Lanes, Minneapolis

MnPASS represents the first application of tolls in Minnesota.

The I-394 HOV lanes are approximately 11 miles in length and include two different designs. A three-mile, two-lane, barrier-separated reversible section is located directly to the west of downtown Minneapolis. To the west of this segment are seven miles of concurrent flow HOV lanes. The reversible lanes provide direct connections with three downtown parking garages, which include bus stops and passenger waiting areas, reduced parking fees for carpoolers, and links to the downtown skyway pedestrian system.

The complete I-394 HOV system was opened in 1992. Although the HOV lanes were well used, averaging between 900 and 1,000 vehicles in the concurrent flow section during the peak hour, interest in considering HOT applications emerged in the early 2000s to help maximize use of the lanes.

In 2003, state legislation was approved allowing the HOT project on I-394. A task force, comprised of 22 individuals appointed by the Governor, the Lieutenant Governor, and communities in the corridor, was formed to help oversee the project.

MnPASS was undertaken to meet a number of objectives. These objectives include increasing the efficiency of I-394 by increasing the person and vehicle-carrying capabilities of the HOV lanes, maintaining free flow speeds for transit and carpools in the HOV lanes, and improving highway and transit in the corridor with project revenues. Other objectives focus on developing ETC and advanced technologies to facilitate dynamic pricing and in-vehicle enforcement.

MnPASS implementation activities included restriping the concurrent flow HOV lanes to change from unlimited to limited access, installation of the ETC and electronic enforcement systems, and marketing the sale of MnPASS transponders, which are available on-line and at the MnPASS Customer Service Center. The MnPASS operating hours on the concurrent flow segment were initially expanded to 24/7. The hours were changed back to the peak-hour, peak-direction after the 24/7 operation caused traffic congestion in the off-peak travel direction.

The sale of MnPASS transponders and use of the lanes have grown since 2005. Some 9,000 transponders have been sold. Traffic counts from mid-2006 recorded 1,756 vehicles using the concurrent flow section in the morning peak hour. HOVs accounted for 63 percent of the traffic, tolled vehicles comprised 32 percent, and some 5 percent were toll violators.

I-25 Express Lanes, Denver

In June 2006, toll paying solo drivers were allowed to use the I-25 HOV lanes. The Express Lanes use ETC, with pre-set variable pricing by time of day. The current fees range from a low of $.50 on Saturdays, Sundays, and off-peak periods to a high of $3.25 during peak times.

Solo drivers must obtain a transponder and maintain an active account to use the Express Lanes. The transponders can also be used on the E-470 and the Northwest Parkway toll facilities.

The development and operation of the HOV lanes and the Express Lanes represent the coordinated efforts of the Colorado Department of Transportation (CDOT) and the Regional Transit District (RTD). The Colorado Tolling Enterprise (CTE), a part of CDOT, assumed operating responsibility when the Express Lanes were initiated.

The Colorado State Patrol and the E-470 Tollway Authority are responsible for enforcement of the I-25 Express Lanes. Video enforcement is used to identify vehicles without valid toll tags.

The I-25 Express Lanes use the same toll tag technology as the toll facilities in the area.

The I-25 HOV lanes were opened in the mid-1990s. Called the *Downtown Express*, the HOV lanes are seven miles in length. The barrier-separated facility includes two lanes with shoulders on each side. Access is provided at both ends of the lane. The lanes operate in the inbound direction toward downtown Denver in the morning and in the outbound direction in the afternoon. A 2+ vehicle-occupancy requirement is used.

Although carpool, vanpool, and bus use of the HOV lanes was good, available capacity existed. Consideration of expanding the eligible user groups to include toll paying solo drivers began in the late 1990s. Enabling legislation was approved in 1999 to allow HOT projects in the state.

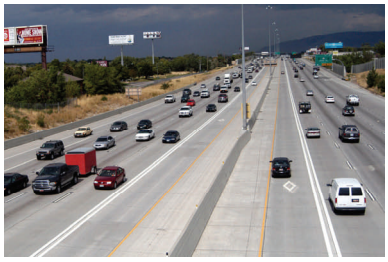
Implementation of the Express Lanes included adding ETC and new signs along the facility. Drivers entering the Express Lane self-declare as HOV or toll-paying vehicles by using the appropriate access lane.

Traffic counts taken in November 2006, 6 months after implementation of the HOT project, show toll vehicles accounting for between 28 percent and 32 percent of the vehicles using the facility. Of the total 1,043 vehicles using the lanes in the afternoon peak hour, 287, or 24 percent, were tolled vehicles, and 756, or 73 percent, were HOVs. In the morning peak hour, tolled vehicles represented 32 percent of the total 899 vehicles, while HOVs accounted for 68 percent. The travel time for buses and carpools has remained relatively constant.

I-25 Express Lanes, Denver

I-15 Express Lanes, Salt Lake City

I-15 Express Lanes



The I-15 Express Lanes in the Salt Lake City area represent the most recent expansion of an HOV lane to an HOV/HOT lane by allowing solo drivers who pay a monthly fee. At 38 miles in length, the I-15 Express Lanes represent the longest HOV/HOT facility in the country.

Solo drivers, who pay a monthly fee, began using the I-15 HOV lanes in September 2006. The Utah Department of Transportation (UDOT) is the lead agency for the Express Lanes. The Utah Highway Patrol (UHP) is responsible for enforcing use of the Express Lanes.

The Express Lanes' pilot project uses branded window decals to identify registered HOT vehicles. The color of the decals, which must be placed on the front and rear windows of a vehicle, changes monthly.

The Express Lanes' decals are only available through credit card purchase on-line at UDOT's Internet site. Initially, 600 decals were available for $50 a month on a first-come, first-serve basis. After the first few months of operation indicated that more HOT vehicles could be accommodated, the number of available decals was increased to 1,350.

The on-line registration site informs interested participants if decals are available. Participants can sign up on a waiting list for automatic notification as decals become available.

Once enrolled, a participant automatically receives a decal for the next month and $50 is charged to the on-file credit card. Participants must cancel before the 15th of the month to terminate participation.

Express LANES

The I-15 HOV lanes opened in segments in the late 1990s and early 2000s. The concurrent flow HOV lanes operated on a 24/7 basis, with unlimited access. Use of the HOV lanes averaged between 650 to 750 vehicles during the peak hour in the peak direction of travel.

UDOT estimated that the lanes could accommodate up to 1,500 vehicles per hour, while maintaining a minimum speed of 55 mph. Under the provisions of SAFETEA-LU, the Utah State Legislature provided UDOT with the authority to allow tolled vehicles to use the HOV lanes in the Spring of 2005. Based on the results of a UDOT feasibility study, the Utah Transportation Commission approved implementation of the Express Lanes pilot program in the Spring of 2006.

Implementation activities included restriping the lanes to change from unlimited access to limited access at designated points. A double white line was added providing a two-foot buffer between the general-purpose lane and the Express Lanes. The access points are designated by a dotted white line.

During the afternoon peak-hour, some 1,400 vehicles are using the Express Lanes in the peak travel direction, but the split between HOVs and HOTs is not known at this time. Travel speeds have remained relatively constant.

Some changes have been made in response to feedback from users and the public. Changes include adding three new access points, relocating two access points, and increasing the length of the access points from 2,000 feet to 3,000 feet. Enhancements were also made to signs in the corridor.

The Express Lanes pilot program is scheduled to operate until 2009, when a decision will be made to convert to ETC or to revert to HOV-only operation.

The Express Lane decals are sold only on-line. Participants automatically receive decals each month, which are charged to their credit card.

I-10 West & US 290, Houston

The QuickRide Program allows two-person carpools to use the I-10 West and the US 290 HOV lanes during the peak hours when a 3+ requirement is in effect.

The *QuickRide* program allows two-person carpools to use the HOV lanes on I-10 West and US 290 for a $2.00 per trip fee during the time periods when a 3+ vehicle-occupancy requirement is in effect. Individuals are required to register for the program and must have an active electronic tag account.

The *QuickRide* program operates from 6:45 a.m. to 8:00 a.m. and 5:00 p.m. to 6:00 p.m. on the I-10 West HOV lane and from 6:45 a.m. to 8:00 a.m. on the US 290 HOV lane. The *QuickRide* program is the only HOV/HOT project that allows two-person HOVs to pay a fee to use an HOV facility, while restricting solo drivers.

The *QuickRide* program was initiated on I-10 West in 1998 as a way of maximizing use of the HOV lane during the 3+ operating periods.

The *QuickRide* program was expanded to include US 290 in 2000. Daily use of the *QuickRide* program has remained relatively constant. When the program started, some 120 participants were using *QuickRide* on I-10 West. By 2003, *QuickRide* users on both lanes were averaging 210 two-person HOVs.

Buses and 3+ carpools continue to represent the majority of users on I-10 West and US 290. Additional options, including allowing tolled solo drivers to use the HOV lanes, continue to be considered.

In addition, the expansion of the I-10 West Freeway includes converting the HOV lane to two managed lanes in each direction. Buses and 3+ carpools will be allowed to use the managed lanes for free, while two-person carpools and solo drivers will pay a toll.

Houston HOV Lane System

The I-10 West HOV lane is 13 miles in length, and the US 290 HOV lane is 14 miles long. Both HOV lanes are one-lane, reversible, barrier-separated lanes, located in the freeway median.

The I-10 West and US 290 HOV lanes are part of a 104–mile HOV lane system in Houston. Components of the HOV system include the HOV lanes, 28 park-and-ride and park-and-pool lots, transit centers, direct access ramps, express bus services, and rideshare programs.

Planning, designing, and operating the HOV system represents a joint effort of the Texas Department of Transportation (TxDOT) and the Metropolitan Transit Authority of Harris County (METRO). The operation of HOV lanes has evolved over time. Only buses and authorized vanpools were allowed to use the I-45 North contraflow lane, which opened in 1979 as the first HOV lane in the area.

Buses and authorized vanpools were allowed to use the I-10 West HOV lanes, which opened in 1984. Based on available capacity, authorized four-person carpools were quickly added to the user groups. Carpool occupancy was lowered to 3+ then to 2+.

At the 2+ level, the HOV lane became too congested, degrading the travel time savings and trip time reliability transit riders had come to expect. As a result, the occupancy requirement was increased to 3+, first during the morning peak hour and later during the afternoon peak hour. The *QuickRide* program helps maximize use of the lanes during the 3+ periods.

HOV/HOT Projects in the Planning Stage

Additional HOV/HOT projects are in various stages of planning and implementation in other areas. SR 167 in Seattle highlighted below is scheduled to open in 2008.

In the San Francisco Bay area, a HOT project is being considered on I-680. In northern Virginia, public/private partnerships are under consideration to develop HOT lanes along I-495, I-395, and I-95. HOT related studies have been conducted in Atlanta and Miami.

SR 167, Seattle

A simulated photo of the SR 167 HOV lanes converted to HOT lanes.

HOV lanes are an integral part of the transportation network in the Puget Sound region. Most of these facilities are concurrent flow HOV lanes, which operate on a 24/7 basis.

The HOV lanes represent the coordinated efforts of the Washington State Department of Transportation (WSDOT), Sound Transit and other transit agencies, local communities, and the Washington State Police. Other supporting components of the HOV system include express bus services, transit centers, park-and-ride and park-and-pool lots, direct access ramps, and carpool and vanpool programs.

Most of the HOV lanes operate at or near capacity during the peak periods. Available capacity exists in some facilities during the peak periods and during other times. Interest in HOT applications emerged during the early 2000s as one approach to increasing the efficiency of some HOV lanes in the region.

Four HOV lanes in the region were considered for the HOT pilot program. The SR 167 HOV lanes were selected due to available HOV lane capacity, peak-hour congestion on the freeway, and the ability to make minor roadway modifications. The Washington State Legislature approved a four-year HOT pilot program.

Implementation of the pilot program includes restriping, changing from unlimited access to limited access, installation of ETC, and other enhancements. The pilot HOT project is scheduled for implementation in 2008.

The SR 167 HOT pilot project is scheduled to open in 2008.

For More Information

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Interested in more information on HOV/HOT projects? FHWA has numerous publications available on HOV lanes, HOT projects, and managed lanes. Many of these reports are available through the FHWA Website and the HOV Pooled-Fund Study (PFS) Website.

FHWA: http://www.fhwa.dot.gov/

HOV PFS: http://hovpfs.ops.fhwa.dot.gov/index.cfm

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